Remarks for the "RESPONSE TO FINAL OFFICE ACTION DATED 7/13/2005 UNDER 37 C.F.R. § 1.116"

Applicant respectfully requests entry of the following remarks and reconsideration of the subject application. Applicant respectfully requests entry of the amendments herein. The remarks and amendments should be entered under 37 C.F.R. §1.116 as they place the application in better form for appeal, or for resolution on the merits.

Applicant respectfully requests reconsideration and allowance of all of the claims of the application. Claims 1-42 and 45-46 are presently pending. Claims amended herein are none. Claims withdrawn or cancelled herein are none. New claims added herein are none.

Formal Request for an Interview

If the Office's response to this communication is anything other than allowance of all pending claims, then Applicant formally requests an interview with the Examiner of the present patent application. Applicant asks the Examiner to call and/or email the undersigned attorney for the Applicant to schedule a convenient date and time for a telephone interview. The undersigned attorney is in the west coast, therefore can typically be found in his office from about 12pm until 7pm (Eastern Time) from Monday through Friday.

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Substantive Claim Rejections

Claim Rejections under §§ 102 and 103

The Office rejects all of the pending claims (1-42 and 45-46) under §102 and/or §103. For the reasons set forth below, the Office has not shown that one or more of the cited references anticipate the rejected claims. For the reasons set forth below, the Office has not made a *prima facia* case showing that the rejected claims are obvious (under §103). Accordingly, Applicant respectfully requests that the rejections be withdrawn and the case be passed along to issuance.

The Office's rejections are based upon the following references:

- **Scalzi:** *Scalzi et al.,* US Patent No. 5,560,013 (issued 9/24/1996);

- **Franz:** Michael Franz, "Emulating an Operating System on Top of Another" Software – Practice and Experience. Vol. 23, No. 6, June 1993, pp. 677-692);

- **Duvall:** *Duvall et al.,* US Patent No. 4,742,447 (issued 5/3/1988);

- **McCoy:** *McCoy et al.,* US Patent No. 5,036,484 (issued 7/30/1991).

Overview of the Application

The Application describes a technology facilitating the operation of non-native program modules within a native computing platform. More particularly, it describes a technology facilitating the interoperability of native and non-native program modules within a native computing platform.

Specifically, this technology involves an emulation of the kernel of the non-native operating system. Instead of interacting with the native kernel of the native computing platform, the non-native program modules interact with a non-native

1 kernel emulator. This emulator handles the necessary conversions and translations.

2 With this non-native kernel emulation, native and non-native program modules are

3 interoperable. Except for the kernel emulator, none of the program module (native

4 or non-native) and none of the other portions of the native computing platform are

5 aware of the emulation. The computing environment and other program modules

6 appear to be non-native to the non-native program modules. Likewise, the non-

7 native program modules appear to be native to the computing environment and the

8 native program modules.

9

Cited References

11 The Office cites **Scalzi** as its reference for is anticipation-based rejections

12 and the primary references in many of its obviousness-based rejections. The

13 Office cites **Duvall** as its primary reference for some of its obviousness rejections

14 and a secondary reference in other obviousness-based rejections. In addition, the

15 Office cites **Franz** and **McCoy** as secondary references in some of its

16 obviousness-based rejections.

Scalzi

Scalzi describes a method of utilizing large virtual addressing in a target

computer to implement an instruction set translator (IST) for dynamically

translating the machine language instructions of an alien source computer into a

set of functionally equivalent target computer machine language instructions,

providing in the target machine, an execution environment for source machine

operating systems, application subsystems, and applications.

The target system provides a unique pointer table in target virtual address space that connects each source program instruction in the multiple source virtual address spaces to a target instruction translation which emulates the function of that source instruction in the target system. The target system stores the translated executable source programs by actually storing only one copy of any source program, regardless of the number of source address spaces in which the source program exists.

The target system manages dynamic changes in the source machine storage, accommodating the nature of a preemptive, multitasking source operating system. The target system preserves the security and data integrity for the source programs on a par with their security and data integrity obtainable when executing in source processors (i.e., having the source architecture as their native architecture). The target computer execution maintains source-architected logical separations between programs and data executing in different source address spaces--without a need for the target system to be aware of the source virtual address spaces.

Duvall

Duvall describes a method for accessing information in a page segmented virtual memory data processing system in which virtual machines running UNIX type operating systems are concurrently established, and in which a memory manager controls the transfer of information between primary and secondary storage devices in response to the occurrence of page faults. The method establishes a plurality of data structures in a dynamic manner in response to a Supervisor call to "map" a file.

The mapping process assigns a new segment of virtual memory to the mapped file and correlates, in one data structure, the virtual address of each page of data in the new segment to a disk file address where that page is actually stored. A UNIX system call by an application program for a specific virtual page is handled by the page fault hanger, and not the UNIX kernel, since the application can supply the real address of the page on the disk file from the data structure that was created by the mapped page range Supervisor call. Simple load and store type of instructions are employed for the data transfer, which avoids much of the overhead that normally accompanies conventional UNIX read and write system calls to the storage subsystem.

Franz

As its name implies, **Franz** discusses the emulation of one operating system on top of another operating system. **Franz** describes the design of an operating-system emulator. This software interface provides the services of one operating system (e.g., Oberon) on a machine running a different operating system (e.g., Macintosh), by mapping the functions of the first onto equivalent calls to the second.

McCoy

McCoy describes a system for emulating the operation of a terminal connected to a host computing system while retaining the ability to utilize personal computer application programs resident in the personal computer by utilizing a personal computer/host terminal emulation program which conducts an analysis of

host data and keystrokes to identify personal computer commands and calls the
appropriate resident application program in response to such commands.

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Anticipation Rejections

Anticipation Rejections Based upon Scalzi

The Office rejects claims 1, 3-6, 9-13, 15-17, 19-28, 34, 37-40, 42, and 45-46 under USC § 102(b) as being anticipated by **Scalzi**. Applicant respectfully traverses the rejections of these claims. Based on the reasons given below, Applicant asks the Office to withdraw its rejections of these claims.

Claims 1, 3, 4, 13, 15, 16, 34, 40, and 45

In the Action, the Office provides the following reasoning for rejecting these claims:

2.   Claims 1,3-6,9-13,15-17,19-28, 34,37-40,42,45-46 are rejected under 35 U.S.C. 102(b) as being anticipated by Scalzi et al (U.S. Patent Number 5,560,013), herein referred to as **Scalzi**.

3.   As to Claims 1,3,4,13,15,16,34, 40 and 45, **Scalzi** teaches: a kernel emulator for non-native program modules, the emulator comprising: an interceptor configured to intercept kernel calls from non-native program modules (Figure 1, element 102 and description); a call-converter configured to convert non-native kernel calls intercepted by the interceptor into native kernel calls (Figure 1, element 103 and description); wherein the call-converter comprises: an instruction-translator configured to translate non-native CPU instructions into native CPU instructions (Figure 1, element 103 and description); an address-translator configured to translate addresses from non-native length into native length (Figure 3 and description, column 21, lines 42-48).

20

In a response to the previous non-final Office action dated 11/30/2004 ("NON-FINAL ACTION"), Applicant indicated that all of these rejected claims recite kernel emulation[1] and operating on or in response to kernel calls. Applicant submitted and again submits that while Scalzi does appear to disclose instructions conversion, it fails to disclose kernel emulation, kernel calls, and interception of such kernel calls.

More specifically, Scalzi never discloses a call to a kernel of an operating system and never discloses emulating a kernel of an operating system. Also, Scalzi never even mentions a kernel of an operating system. As part of that response, Applicant noted that many of these claims[2] recite an interception of a kernel call. Since Scalzi never mentions kernel calls, it is logical that is never discloses intercepting such calls.

In its final Office action dated 7/13/2005 ("NON-FINAL ACTION"), the Office proposed (on pp. 2-3) that Scalzi inherently and inferentially discloses kernel emulation and operating on or in response to kernel calls. More specifically, the Office indicated the following:

> 7. Applicants are thanked for addressing this issue. Applicants state the Scalzi (U.S. Patent 5,560,013 (1996)) reference doesn't disclose kernel of an operating system. According to Microsoft Press Computer User's Dictionary, 1998 edition, a kernel is defined (pg. 201) as *the core of an operating system—the portion of the system that manages memory, files and peripheral devices; maintains the time and date; launches application; and allocates system resources.* Sclazi defines the core operating systems as the "target system" that is defined (abstract) as *efficiently stores the translated executable source programs by actually storing only one copy of any*

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[1] E.g., "kernel emulator" in claims 1, 40 and 45, "emulating a kernel" in claim 13, and "emulating a non-native kernel" in claim 34

[2] E.g., independent claims 1, 13, and 45

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source program, regardless of the number of source address spaces in which the source program exists. The target system efficiently manages dynamic changes in the source machine storage, accommodating the nature of a preemptive, multitasking source operating system. The target system preserves the security and data integrity for the source programs on a par with their security and data integrity obtainable when executing in source processors (i.e. having the source architecture as their native architecture). The target computer execution maintains source-architected logical separations between programs and data executing in different source address spaces—without a need for the target system to be aware of the source virtual address spaces. Summarily, both terms are defined as the managing source of the computer (highlight emphasized), thus equating the same purpose.

Applicants state Scalzi doesn't disclose interception of a kernel call or kernel emulation. Based on the latter analysis of equivalence between kernel and target system examiner argues the kernel call as inherent for the simple reason that if a translation function is an event between nativity and non-native functions then a call is understood as an integral part to the translation function (Scalzi: column 5, lines 9-11, "instruction translation"; column 5, lines 38-40). Base on the previous analysis, the rejection stands.

Applicant maintains it position that Scalzi never discloses (directly, inferentially, or inherently) a call to a kernel of an operating system and never discloses emulating a kernel of an operating system. Instead, Scalzi discloses a "machine" emulator and instruction "translator."

The subject-mater of one or more of these claims (e.g., claim 1) recites an emulation of a non-native kernel (of a non-native operating system) so that non-native programs may operate on a computer with a "native" kernel (of a "native" operating system). However, Scalzi never discloses this.

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Applicant submits that instead of disclosing "kernel" emulation (which is the subject matter of the rejected claims), Scalzi discloses "machine" emulation or, put another way, emulation of a "computing hardware architecture."

The difference between "hardware" and "kernel" emulation is more than a mere distinction. The difference has real and practical considerations.

Now, distinguishing between the two types of emulation is a bit confusing. That is because the "kernel" and "hardware" are interrelated in a "computing platform." Indeed, p. 1, lines 20-21 of the Application notes the following: "A computing platform typically includes an operating system (OS) [of which the kernel is part thereof] and [a] computing hardware architecture."

Since the kernel is layered on-top of the hardware, changes to the hardware typically necessitate changes to the kernel. However, the opposite is not true. The kernel may be changed and re-organized without necessitating a change to the hardware.

For example, the Application describes the concepts of virtual machines (VMs) on pp. 7-8 of the Application and illustrated in Fig. 2. The VM emulates the non-native hardware layer 250 in software. To run non-native applications (such as 212a and 212b) within a VM, a non-native kernel runs on top of the emulated non-native hardware layer 250. These three are executed solely in software in a segregated "box" 200. There are other possible arrangements for a VM other than what is shown in Fig. 2. For example, some or all of the VM components may be implemented within the native kernel 130.

Applicant submits that Scalzi performs hardware emulation or more particularly a variation of a VM. Scalzi primarily performs this hardware emulation by two mechanisms: a large virtual addressability scheme (which is the

subject of U.S. Patent Application Serial No. 08/349,771, which matured into U.S. Patent No. 5,577,231) and binary translation of instructions. Col. 1, lines 35-40 of Scalzi defines binary translation, but in short, it is a technique for automatically converting the machine instructions—instruction by instruction—of one computing platform to those of another. Note, that this involves the translation of "machine instructions" and not kernel calls.

As shown above, Scalzi does not disclose all of the claimed elements and features of these claims. Accordingly, Applicant asks the Office to withdraw its rejection of these claims.

Claims 2-12

These claims ultimately depend upon independent claim 1. As discussed above, claim 1 is allowable.

In addition to its own merits, each of these dependent claims is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of each of these dependent claims because its base claim is allowable.

Moreover, Applicant submits that Scalzi discloses conversion of a "machine" instruction and that is not equivalent to translation of kernel calls.

Claims 14-28

These claims ultimately depend upon independent claim 13. As discussed above, claim 13 is allowable.

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In addition to its own merits, each of these dependent claims is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of each of these dependent claims because its base claim is allowable.

Claims 35-39

These claims ultimately depend upon independent claim 34. As discussed above, claim 34 is allowable.

In addition to its own merits, each of these dependent claims is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of each of these dependent claims because its base claim is allowable.

Claims 41 and 42

These claims ultimately depend upon independent claim 40. As discussed above, claim 40 is allowable.

In addition to its own merits, each of these dependent claims is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of each of these dependent claims because its base claim is allowable.

Claim 46

This claim ultimately depends upon independent claim 45. As discussed above, claim 45 is allowable.

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In addition to its own merits, this dependent claim is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of this dependent claim because its base claim is allowable.

Obviousness Rejections

Lack of *Prima Facie* Case of Obviousness (MPEP § 2142)

Applicant disagrees with the Office's obviousness rejections. Arguments presented herein point to various aspects of the record to demonstrate that all of the criteria set forth for making a *prima facie* case have not been met.

Based upon Scalzi and Franz

The Office rejects claims 2 and 14 under USC § 103(a) as being unpatentable over **Scalzi** in view of **Franz**. Applicant respectfully traverses the rejection of this claim. Applicant asks the Office to withdraw its rejection of this claim.

Claims 2 and 14

Claim 2 ultimately depends upon independent claim 1. As discussed above, claim 1 is allowable. Claim 14 ultimately depends upon independent claim 13. As discussed above, claim 13 is allowable.

In addition to its own merits, each of these dependent claims is allowable for the same reasons that its base claim is allowable. Applicant submits that the

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Office withdraw the rejection of each of these dependent claims because its base claim is allowable.

Based upon Scalzi and Duvall

The Office rejects claims 7, 8, 18, 35, and 41 under USC § 103(a) as being unpatentable over **Scalzi** in view of **Duvall**. Applicant respectfully traverses the rejection of this claim. Applicant asks the Office to withdraw its rejection of this claim.

Claims 7, 8, 18, 35, and 41

Claims 7 and 8 ultimately depend upon independent claim 1. As discussed above, claim 1 is allowable. Claim 18 ultimately depends upon independent claim 13. As discussed above, claim 13 is allowable. Claim 35 ultimately depends upon independent claim 34. As discussed above, claim 34 is allowable. Claim 41 ultimately depends upon independent claim 40. As discussed above, claim 40 is allowable.

In addition to its own merits, each of these dependent claims is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of each of these dependent claims because its base claim is allowable.

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Based upon Duvall and McCoy

The Office rejects claims 29-33 under USC § 103(a) as being unpatentable over **Duvall** in view of **McCoy**. Applicant respectfully traverses the rejection of this claim. Applicant asks the Office to withdraw its rejection of these claims.

Claim 29

In the Action, the Office provides the following reasoning for rejecting this claim:

29. Claims 29-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duvall and further in view of McCoy et al (U.S. Patent Number 5,036,484), herein referred to as McCoy.

30. As to Claim 29, Duvall teaches: a method comprising: if the initiating program is non-native: limiting available memory to a range that is addressable by the non-native program module (column 4, lines 43-46, column 6, lines 25-29, column 9, lines 20-25); establishing non-native a version of a shared memory data structure that may be synchronized with a native version of the same shared memory data structure (column 5, lines 45-51, column 6, lines 25-29).

31. Duvall further teaches the data in a segment of virtual memory is created as a result of an application program being run (column 5, lines 52-55). While this implies that must be some determination as to weather a program is native or non-native allowing for the segment in virtual memory to be created, Duvall does not expressly teach determining whether an initiating program module is a native or non-native.

32.   McCoy teaches determining whether an initiating program module is a native or non-native **(Figure 3a, element 36a, column 5, lines 40-48)** in a system that emulates a host program in a PC environment and translates host data to PC format by the emulation program **(column 5, lines 28-31)**, allowing the system to know whether to perform a function of the native system or perform a function of the non-native system which includes the translation of code **(Figure 3a, element 31a and column 5, lines 40-48)** since in the emulation systems of the prior art, when operating in emulation mode, the native system is incapable of performing functions other than those of the terminal which is being emulated. Therefore, the functions of the personal computer are not available in the emulation mode **(column 1, lines 32-39)**.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify since it would be advantageous to use McCoy to modify Duvall since a proliferation of many software programs has led to a lack of uniformity in the way in which data is formatted... and the presence of functions or operations which are unique to each program (column 1, lines 45-50), despite the fact that processors are operating at ever increasing speeds and efficiencies...nevertheless there's a finite delay between the time the operator request a document for conversion processing (column 2, lines 45-50).

Duvall discloses virtual machine (VM) technology, which the Applicant discusses in its Background section on p. 7 and 8 of the Application. **Duvall** discloses a new addressing scheme for VMs to use to read/write from/to a "file" (rather than memory). Duvall does not disclose "limiting available memory to a range that is addressable." Rather, it discloses a re-definition and re-arrangement of the meaning of the bits in the existing and unmodified addressable range.

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1   In the response to the NON-FINAL ACTION, Applicant amended this

2 claim in the following manner to make it clear that the "limiting" has the effect of

3 reducing the range of available memory that a non-native program module may

4 address:

5

6   limiting available memory to a range that is addressable by the non-native
      program module, that range of addressable memory being less that the available

7   memory

8

9   Applicant submits that this above-identified amended language (which as

10 was added in the the response to the NON-FINAL ACTION) has not been

11 examined herein. The Office makes not reference in this Action to this amended

12 language and has cited nothing in any reference which discloses this language.

13   Moreover, the Office has not identified where **Duvall** discloses "non-

14 native" program modules. Indeed, since **Duvall** discloses a VM model, then all

15 program modules operating under a particular VM are presumptively native to that

16 VM. If not, then an emulator would be necessary, but **Duvall** does not disclose an

17 emulator.

18   While **McCoy** does disclose a nominal "emulator," it is not an emulation

19 related to program modules being considered native or non-native. Rather,

20 McCoy discloses a terminal emulation—that is, emulation of the operation of a

21 "dumb" terminal connected to a host computer (e.g., mainframe computer).

22   The Office indicates the **McCoy** discloses an initiation of a program

23 module based upon a determination of whether a program is native or non-native.

24 It points to col. 5, lines 40-48, Fig. 3a, element 36a, which is reproduced here:

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Keystrokes on the keyboard/display 35a are examined by the keystroke interpretation portion 36a of the emulation program to determine whether a PC or a host function is required. Program block 36a is responsive to the selected mode. In the PC mode, the keystrokes are handled by block 37a as normal keyboard commands or data. In the emulation mode, the keystrokes representing the host keys are passed to the host processor via the host emulator 31a.

However, this particular cited portion (and McCoy as a whole) are focused on determining from whence input (e.g., keystrokes) is received and processing them accordingly. The first sentence of the passage above says, "Keystrokes...are examined...to determine whether a PC or a host function is required." Applicant respectfully submits that this is not equivalent to "determining whether an initiating program module is a native or non-native."

Indeed, Applicant submits that all of McCoy's program modules (include the McCoy's terminal emulation program itself) are presumptively native. If they were non-native, then they would not function on the PC absent an operating-system based emulation program. However, McCoy does not disclose such an emulation program.

For the reasons given above, Applicant submits the combination of Duvall and McCoy fail to disclose all of the elements and features of this claim. Accordingly, Applicant asks the Office to withdraw its rejection of this claim.

No Motivation to Combine References

Furthermore, Applicant asserts that there is no motivation to combine the teachings of Duvall and the teachings of McCoy.

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As discussed above, **Duvall** describes an addressing scheme for accessing files in a VM environment. However, **McCoy** describes "dumb" terminal emulation on a PC.

Applicant submits that there is no suggestion, teaching, or reason given by one reference that would motivate one of ordinary skill in the art at the time of the invention (hereinafter, "OOSA") to combine it with the teachings of the other reference. More importantly, Applicant submits that the Office has not provided any objective evidence showing why OOSA would be motivated to combine the teachings of the two references.

Duvall says nothing that would motivate OOSA to look towards **Chipman** and combine their teachings. Likewise, **McCoy** says nothing that would motivate OOSA to look towards **Duvall** and combine their teachings.

Accordingly, Applicant submits that OOSA would not be motivated to combine the VM file-access I/O addressing scheme of **Duvall** with the "dumb" terminal emulation of **McCoy**. Accordingly, Applicant asks the Office to withdraw its rejection of this claim.

Claims 30-33

These claims ultimately depend upon independent claim 29. As discussed above, claim 29 is allowable.

In addition to its own merits, each of these dependent claims is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of each of these dependent claims because its base claim is allowable.

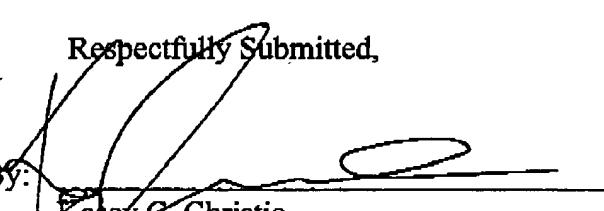Serial No.: 09/847,535
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Dependent Claims

In addition to its own merits, each dependent claim is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of each dependent claim where its base claim is allowable.

Conclusion

All pending claims are in condition for allowance. Applicant respectfully requests reconsideration and prompt issuance of the application. If any issues remain that prevent issuance of this application, the Office is urged to contact the undersigned attorney before issuing a subsequent Action.

Respectfully Submitted,

Dated: 11-14-05

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